KELLEY-KOETT

KELEKET

COVINGTON, KY.

KELEKET

World Famous X-Ray Equipment

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KELEKET

INDUSTRIAL X-RAY EQUIPMENT

Founded in 1900, only a few years after Roentgen's discovery of X-rays, The Kelley-Koett Manufacturing Company has established one milestone after another in the decades that have ensued.

Creators of quality X-ray apparatus for the medical profession, Keleket also pioneered the design and construction of equipment for X-ray inspection in industry. Even in World War I, Keleket assisted many manufacturers who were confronted by difficult problems of examination to detect hidden defects.

Today, when World War II demands speed of production and elimination of waste, Keleket apparatus is again being called upon to speed up the war program.

From thinnest aluminum sheet to heavy armor plate, X-ray examination with Keleket equipment is revealing hidden flaws which might cause disastrous failure in service -- is revealing defects in raw materials, thus preventing useless machining -- is revealing facts about the molecular construction of matter thus pointing

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the way to development of stronger, better substitutes for critical raw materials.

Keleket's modern Industrial Equipment is compact, flexible, and completely shockproof. It is illustrated and briefly described on succeeding pages. Additional information and expert consultation on specific problems are available from direct Branch Offices located in 64 cities (see list included with this booklet).

A well equipped laboratory is maintained in the Industrial Division of the Keleket Company at Covington, Kentucky. You are invited to send in samples for tests. Radiographs will be made and interpreted, and specific recommendations to meet individual problems will be offered, as a part of Keleket's contribution to speeding production for Victory.

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THE KELEKET 400 KV INDUSTRIAL UNIT

Completely self-contained, this 400,000 volt unit affords unexcelled compactness and flexibility. It can be used effectively and economically on steel castings or plate from 1/2 to 5 inches thick.

All equipment is rigidly mounted and firmly supported. No crane need be used to position the tube-head -- a simple adjustment of a light-weight cone carriage suffices to direct the X-ray beam along the desired path.

Frequently mounted on a chassis moving along floor rails, the main tube drum is completely shockproof and is lined with an adequate thickness of lead to protect the operator.

The vertical type control panel can be housed in an operator's booth, lead-lined to protect the operator during exposures, and with lead-glass windows for observation of the work.

Optimum gradation in density, and crisp clear films are produced by the special Keleket Industrial Technic. A wide range of voltage control (150 to 400 kilovolts) permits selection of technical factors best suited to thickness and composition of the material under study. Complete fidelity of image can be secured on parts from 1/2 to 5" thick, fully complying with stringent specifications such as those of the American Boiler Code.

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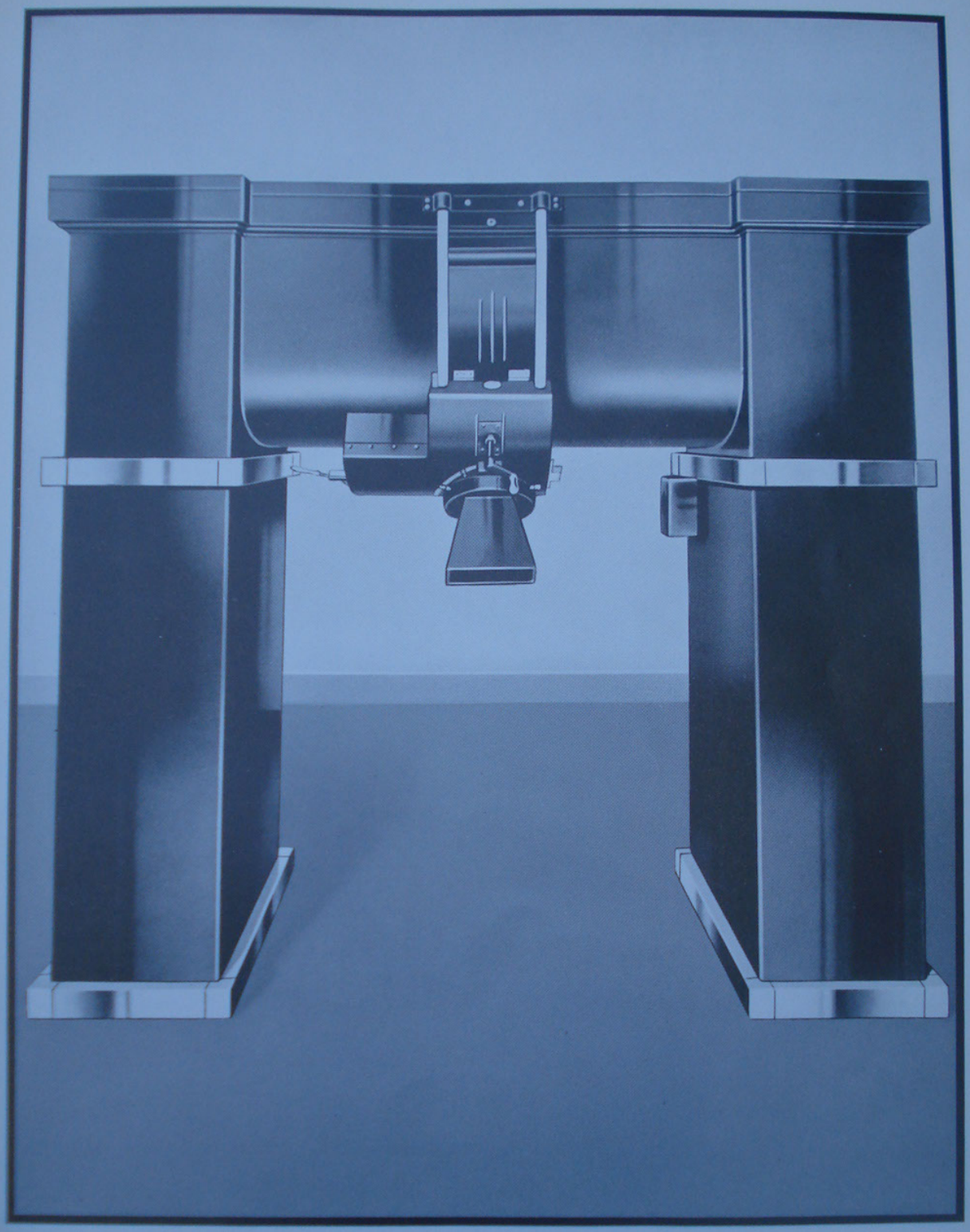

400 KV INDUSTRIAL UNIT

PIONEER CREATORS OF *Quality* X-RAY EQUIPMENT SINCE 1900

(C) Jeff Behary 2021

400 KV INDUSTRIAL CONTROL

PIONEER CREATORS OF *Quality* X-RAY EQUIPMENT SINCE 1900

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KELEKET 220KV INDUSTRIAL UNIT

Shockproof and highly flexible, the Keleket Industrial 220 provides an unusually compact installation for a unit of such power. Rated at

200,000 volts, 25 milliamperes
220,000 volts, 20 milliamperes

the tube may be used with grid bias when desired, giving an X-ray beam of high quality with great penetrating power. Steel up to $3\frac{1}{2}$ inches thick may be examined with confidence that flaws exceeding safe limits will be clearly visible.

The X-ray tube is continuously cooled by a steady stream of oil in contact with the anode itself, the heat being removed in a separate oil cooler supplied with the unit. Shockproof cables connect the tube to the oil-immersed transformers, completing a thoroughly safe installation in minimum floor space.

Fully counterbalanced, the tube stand incorporated the added refinement of vernier drive for all adjustments -- elevation, angulation and cross-travel.

When very rapid examination is desired, the Industrial 220 can be adapted to fluoroscopy, permitting visual examination on a fluorescent screen. Suspicious parts may then be permanently recorded on a film for more careful study.

Available with either Vertical or Floor type control stands, the 220 KV Industrial Unit covers a broad field of aluminum alloy, bronze, and steel products.

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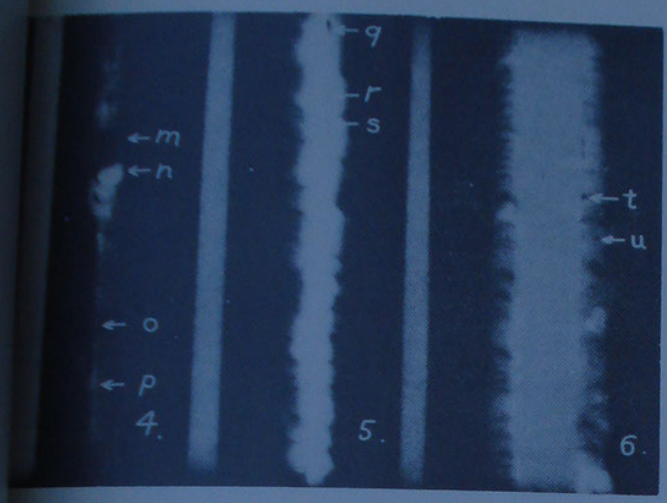
TYPICAL RADIOGRAPH OF WELDED JOINT



The reproduction at the left is typical of the work done with a Keleket 220 KV Industrial Unit. The welds were made in rapid succession, altering the welding technic until the proper weld was secured. Experimenting with pilot material is a simple method of correcting errors in technic and obtaining perfect results.

INTERPRETATION

gure 4 illustrates an unsatisfactory weld. Grayish appearance indicates insufficient welding metal. Smooth edges show lack of penetration into walls of joint. Blowhole at "m" caused piling of excess metal at "n". Welding metal piled against walls of joint in straight line from "o" to "p" with no penetration and no fusion.

gure 5 illustrates another unsatisfactory weld although its surface appearance was excellent. White shadow indicates excess of welding metal. Hazy, irregular edges show lack of penetration into walls of joint and incomplete fusion. Arrows point to entrapped slag, indicated by dark spots on film, producing flaws of dangerous size.

gure 6 illustrates a completely satisfactory weld of unusual width. Thickness of welded metal neither too great nor too small, and bears proper relationship to adjoining plate as shown by relative density of shadows. Excellent penetration and complete fusion, with flowing at walls of joint producing smooth edge with characteristic waves. Slight porosity at "t" and "u" due to entrapped slag or gas bubbles, but dimensions are small and weld is fully acceptable.

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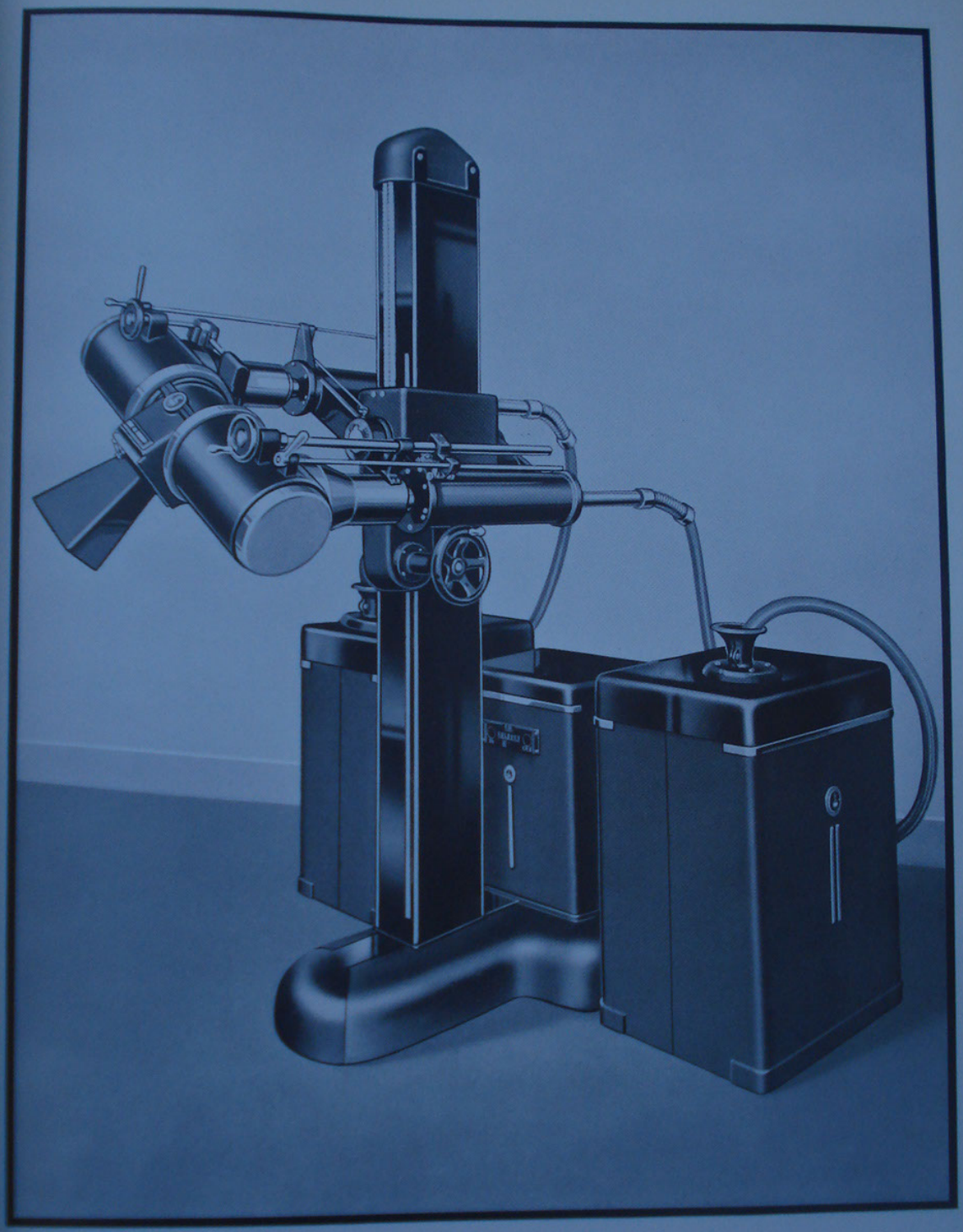

220 KV INDUSTRIAL UNIT

EQUIPPED WITH LOCALIZING DIAPHRAGM

PIONEER CREATORS OF *Quality* X-RAY EQUIPMENT SINCE 1900

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220 KV INDUSTRIAL CONTROL

PIONEER CREATORS OF *Quality* X-RAY EQUIPMENT SINCE 1900

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KELEKET 150 KV MOBILE INDUSTRIAL UNIT

For examination of steel castings or forgings up to 1-1/2 inches thick, the Keleket 150 KV Mobile Industrial Unit affords sharp detail and maximum film quality. Its light weight and easy mobility extend its usefulness to the entire shop, permitting examination of work in process without interrupting production lines.

The shockproof, rayproof X-ray tube supplied with the Industrial 150 Mobile has been especially developed by Machlett Laboratories for industrial use. The extremely small focal spot makes possible very sharp detail in small parts and thin sections. For thicker parts, the focal spot-film distance may be decreased to shorten exposure time without sacrifice of detail.

Tube stand, transformer, and control are mounted on a chassis with rubber-tired wheels, producing a complete unit ready to be connected to any convenient power outlet. When desired, a built-in cooling unit may be incorporated. Perfect counterbalancing of the tube and wide range of vertical, transverse, and angular motions permit ready accommodation to castings or forgings of unusual shape.

The control cabinet facilitates precise adjustment of kilovoltage, milliamperage, and exposure time. In combination with the Keleket Industrial Technic especially compiled for this unit, the "150 MOBILE" gives excellent results in the hands of the average employee.

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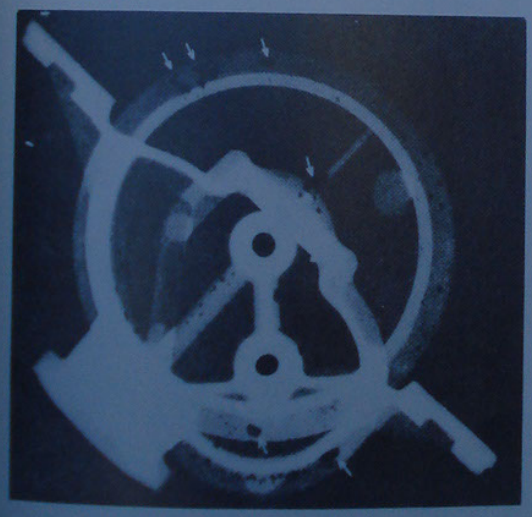
RADIOGRAPHY WITH KELEKET 150 KV MOBILE INDUSTRIAL UNIT

Aluminum castings and forgings usually present a difficult inspection problem, but one which can be solved quickly and easily with radiographic examination. The exterior appearance is usually flawless, yet the part may contain hidden defects which will be uncovered only after many hours of machining have been wasted.

It is impossible to avoid destruction of castings and forgings if they are examined by etching or machining away the surface. Yet with X-ray analysis, a complete picture of the interior can be obtained at any stage of fabrication, and the part can continue to final finishing for a performance test.

As an example of radiography with 150,000 volts or less (available in the Keleket Industrial 150 Mobile), the reproduction below shows a casting intended for use in an airplane engine.



Perfect in external appearance, this casting could never withstand the tremendous hammering and vibration to which it would be subjected in service. Failure in time of combat might be the turning point of an engagement -- might result in loss of plane and pilot.

The Air Corps insists on radiographic inspection of vital airplane parts, well aware of the fact that no other method produces so much information at so little cost; that no other method is so completely non-destructive; and that no other method prevents waste of precious machine-hours on defective raw material.

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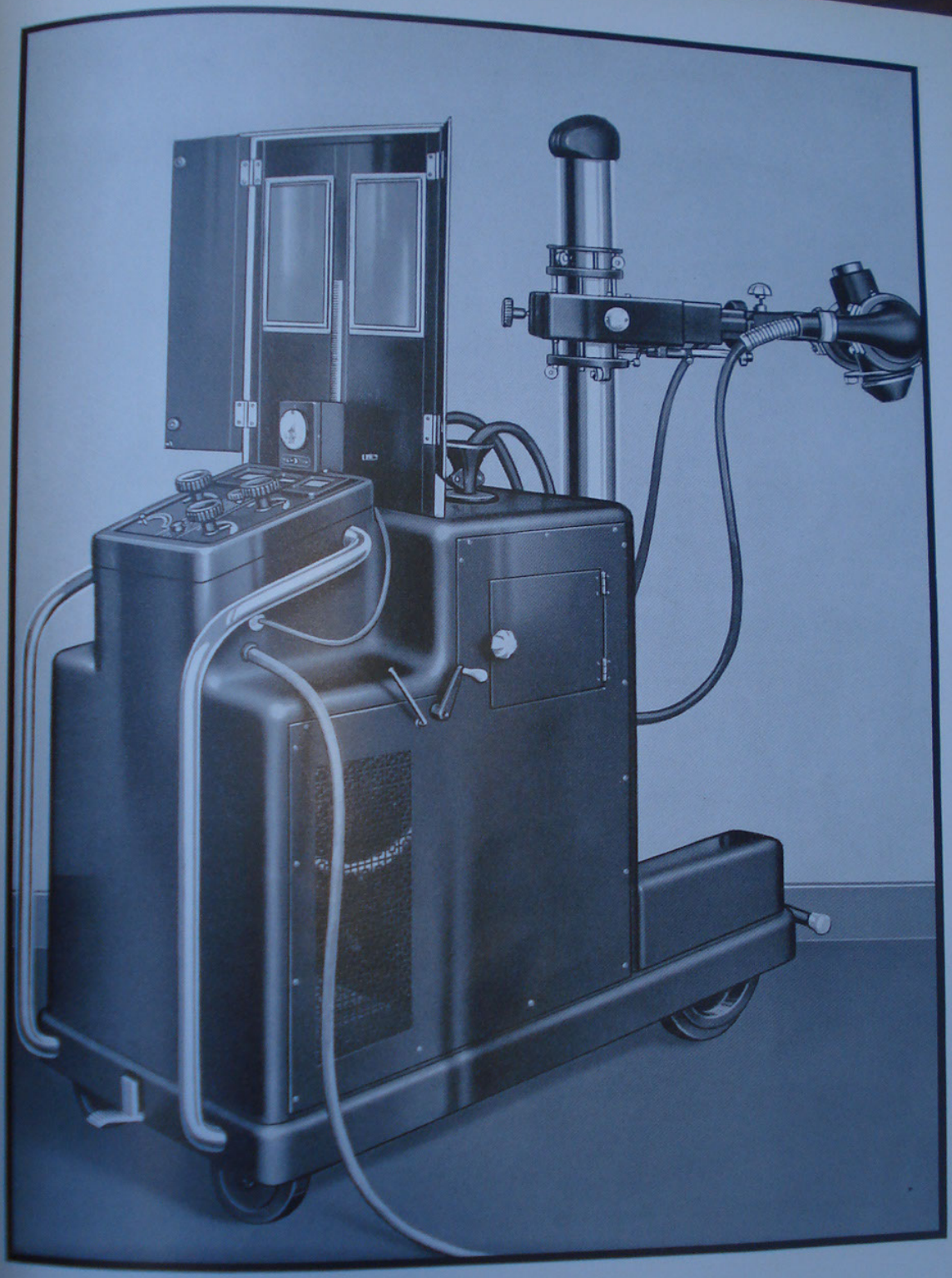

150 KV MOBILE INDUSTRIAL UNIT

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KELEKET 150 KV FLOOR MOUNTED INDUSTRIAL UNIT

Designed for use in a fixed location, the transformer and control supplied with this unit are identical with that incorporated in the "150 MOBILE". Steel up to 1-1/2 inches thickness, or aluminum, copper or bronze in moderate thicknesses, can be examined before, during, or after fabrication.

Although any suitable tube may be used with the INDUSTRIAL 150, the Machlett INDUSTRIAL THERMAX X-ray tube is recommended, to be mounted on a tripod or rail-mounted tube stand. When energized by the INDUSTRIAL 150, the tube insures sharp detail and high definition.

Available in rail-mounted type or tripod type, the tube stand is especially designed to support the Machlett INDUSTRIAL THERMAX tube when used with the Keleket INDUSTRIAL 150 unit.

Vertical and horizontal travel are adequate for rapid positioning of the tube even when large castings are to be examined. Rotation about the long and short axis of the tube insure proper beam angulation with respect to the X-ray film.

Special clamping rings hold the X-ray tube, maintaining minimum over-all size of the tube support. Friction and screw type locks are used to immobilize the tube in all planes after positioning.

The rail-mounted tube stand is ideally suited for use over a bench or conveyor belt, affording longitudinal travel of 67 inches. Transverse travel amounts to 16 inches, permitting adequate coverage across the bench or belt.

Tripod mounting is also available, the tube stand moving freely on three swivel casters. The tripod stand is advantageous when size or contour of the part necessitate use of unusual X-ray beam angles.

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KELEKET RADIOGRAPHIC AND DIFFRACTION UNIT

This dual-purpose unit opens a wide field of investigation. Designed for use as a radiographic unit for studying thin metal sheets, it offers the added advantage of low kilovoltage for diffraction analysis.

Micro-radiography, which consists of making a film in the usual manner and examining it with a microscope, has uncovered new facts about the reaction of thin metals during spot-welding or machining. As a result, spot-welding technic has been improved to such an extent that it replaces riveting in many applications.

Diffraction analysis of metals and alloys, long recognized as the only method of studying molecular behavior, is used to supplement the information obtained from micro-radiography. In diffraction analysis, the X-ray beam is "reflected" by the molecules just as ordinary light is split up by a diffraction grating. The patterns obtained by diffraction may be readily analyzed to yield valuable data.

The Keleket RADIOGRAPHIC and DIFFRACTION unit permits the use of voltages from 10,000 to 100,000 for radiography; and from 5,000 to 50,000 for diffraction analysis. It is especially suited for use with Machlett Diffraction Tubes, available in several types for specific applications, or with Machlett type CYS tubes for conventional radiography.

Receptacles on the transformer are designed to receive shock-proof cables for either type of tube, affording a safe, compact installation with remarkable flexibility.

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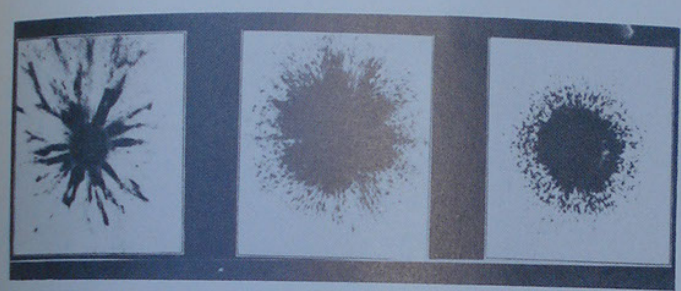
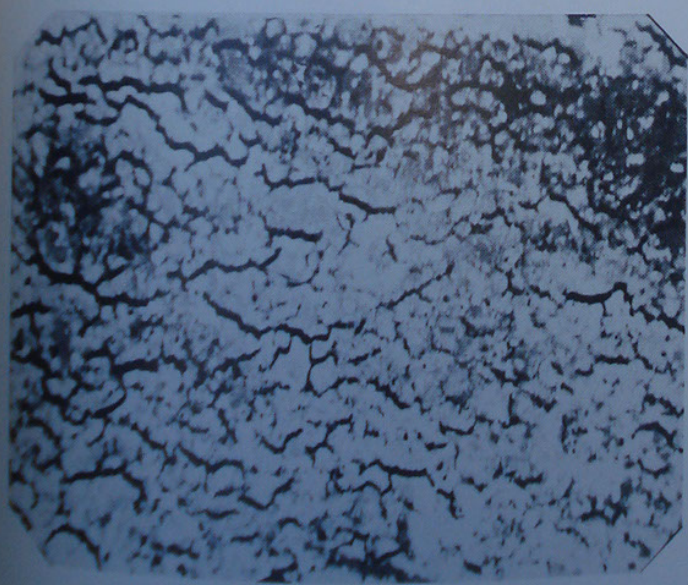
DIFFRACTION ANALYSIS -- MICRO-RADIOGRAPHY

The Keleket Diffraction Unit makes it possible to peer into the very composition of matter and visualize the arrangement of molecules. The figure below shows three diffraction patterns taken of one sample of steel. The pattern on the left indicates that the molecules are arranged in haphazard fashion and are under great strain.



After partial annealing, the middle pattern is obtained -- the molecules are rearranging themselves in more symmetrical fashion. After complete annealing, the pattern on the right indicates all strain has been relieved.



Micro-radiograph of cartridge brass, showing season-cracks. Relative density of shadows indicates whether cracks extend partially or all the way through the specimen.

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RADIOGRAPHIC AND DIFFRACTION UNIT

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KELEKET 85 KV MOBILE INDUSTRIAL UNIT, TYPE KY

Plastics and metal parts of moderate thickness may be rapidly examined anywhere in the shop by means of the Keleket Industrial unit, type KY. Perfected through many years of use in medical radiography, this unit combines operating conveniences usually found only on much larger apparatus.

Full range of kilovoltage (up to 80 peak kilovolts at 30 milliamperes, or 90 peak kilovolts at 15 milliamperes) permits selection of radiographic energy best suited for a given thickness of structure. Flaws amounting to as little as 2% of total thickness of part can be readily detected.

X-ray tube and transformers are mounted in a metal container permanently sealed and filled with oil. The unit is unaffected by altitude or humidity and is completely dust-proof.

Full range of adjustment both vertically and longitudinally, and full angulation about the supporting carriage, permit ready accommodation of X-ray beam direction. Locks are provided to immobilize the unit after beam adjustment has been made.

With a minimum amount of accessory equipment, the unit can be utilized for rapid fluoroscopic examination of small parts. Suspicious parts can be removed from the production line for more detailed radiographic study.

Completely self-contained, the type "KY" unit may be readily moved about the plant, to be plugged into any convenient outlet.

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85 KV MOBILE INDUSTRIAL UNIT

PIONEER CREATORS OF *Quality* X-RAY EQUIPMENT SINCE 1900

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All of the Keleket Branch Offices listed on succeeding pages can supply complete darkroom equipment, as well as all accessories used in industrial radiography.

The items listed below are carried in stock at each office or can be obtained from the Keleket factory at Covington overnight:

Industrial X-ray Films

Developer and Fixer

Cassettes

Intensifying Screens

X-ray Tubes

Valve Tubes

Keleket's Planning and Lay-Out Department is constantly available to design Radiographic Rooms and Darkrooms. Complete blueprints and suggested equipment will be supplied without obligation.

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SECTION Q

THERE IS A KELEKET BRANCH NEAR YOU

Keleket has manufactured a complete line of X-ray apparatus and accessories since 1900. Every X-ray rement for small office or complete laboratory is provided for in the products manufactured or carried by ket. Keleket service can be obtained within 24 hours anywhere in the United States. These branches, con- ently located, are your means of contact with Keleket. They have been established to serve your needs.

List of Keleket Branches

BAMA
rmingham—McKesson & Robbins, Inc., 1706 First Ave. Phone 3-4171.

ONA
hoenix—Southwestern Surgical Supply Co., 143 N. 1st St. Phone 3-319.

ANSAS
rviced from Memphis, Tennessee, or Tulsa, Oklahoma.

FORNIA
os Angeles—The Kelley-Koett Mfg. Co., 2300 W. 7th St. Phone: Federal 4197.
an Francisco—The Kelley-Koett Mfg. Co., 355 Stockton St. Phone: Sutter 7302.

ORADO
enver—Geo. Berbert & Sons, 1524-30 Court Place. Phone: Ke. 8428-2587.

NECTICUT
ew Haven—Professional Equipment Co., 36 Howe St. Phone: 7-2138.

AWARE
rviced from Philadelphia, Pennsylvania.

RICT OF COLUMBIA
he Kelley-Koett Mfg. Co., 911 Chandler Bldg. Phone: National 4049

RIDA
cksonville—Keleket X-Ray Co. of Florida, 307 St. James' Bldg. Phone: 3-0338.
iami—Keleket X-Ray Co. of Florida, 6209 Biscayne Blvd. Phone: 7-1408.
rlando—Keleket X-Ray Co. of Florida, Wayne C. Hunt, Fort Gatlin Hotel.
ampa—Keleket X-Ray Co. of Florida, D. H. Sample, 4524 Azeele St. Phone: H-41-562.

RGIA
tlanta—S. & H. X-Ray Co., 501 N. E. Peachtree St. Phone: Wal. 5042-43.

O
orthern Idaho is serviced from Tacoma, Washington.
outhern Idaho is serviced from Portland, Oregon.

OIS
hicago—The Kelley-Koett Mfg. Co., Room 223, America Fore Bldg., 844 North Rush St. Phone: Whitehall 5893.
outhern Illinois is serviced from St. Louis, Mo.

ANA
ndianapolis—The Kelley-Koett Mfg. Co., 1138 Hume Mansur Bldg. Phone: Lincoln 2220.
orthern Indiana is serviced from Chicago, Ill.
outhern Indiana is serviced from Louisville, Ky.

es Moines—The Kelley-Koett Mfg. Co., 2412 45th St. Phone: Des Moines 7-2700.
estern Iowa is serviced from Omaha, Neb.

KANSAS
Northern Kansas is serviced from Omaha, Neb.
Rest of Kansas is serviced from Kansas City, Mo.

KENTUCKY
Covington—(Home Office and Factory) The Kelley-Koett Mfg. Co., 212 W. 4th St. Phone: HEmlock 4450-51-52-53.
Louisville—The Kelley-Koett Mfg. Co., 4632 Westchester Ave. Phone: Shawnee 3879.
Eastern Kentucky is serviced from Charleston, W. Va.
Western Kentucky is serviced from St. Louis, Mo.

LOUISIANA
Shreveport—R. P. Kincheloe Co., 332 Olive St. Phone: 3-7796.

MAINE
Serviced from Boston, Mass.

MARYLAND
Central Maryland is serviced from the District of Columbia
Eastern Maryland is serviced from Philadelphia, Penn.
Western Maryland is serviced from Pittsburgh, Penn.

MASSACHUSETTS
Boston—The Kelley-Koett Mfg. Co., 739 Boylston St. Phone: Kenmore 3800.

MICHIGAN
Detroit—Evans-Sherratt Co., 532 Maccabee Bldg. Phone: Columbia 2310.
Northern Michigan is serviced from Milwaukee, Wis.

MINNESOTA
Minneapolis—The Kelley-Koett Mfg. Co., 829 Second Ave., South. Phone: Atlantic 7174.

MISSISSIPPI
Serviced from Memphis, Tenn.

MISSOURI
Kansas City—The Kelley-Koett Mfg. Co., 333 Argyle Bldg. Phone: Harrison 4862.
St. Louis—The Kelley-Koett Mfg. Co., 4905 Delmar Blvd. Room 6. Phone: Forest 7427.

MONTANA
Serviced from Tacoma, Washington.

NEBRASKA
Omaha—The Kelley-Koett Mfg. Co., 1625 Howard St., Aquila Ct. Phone: Jackson 2337.

NEVADA
Serviced from San Francisco, Cal.

NEW HAMPSHIRE
Serviced from Boston, Mass.

NEW JERSEY
Newark—The Kelley-Koett Mfg. Co., Room 202, 20 Washington Place. Phone: Market 3-2428.
Southern New Jersey is serviced from Philadelphia, Penn.

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NEW MEXICO
Serviced from El Paso, Texas.

NEW YORK
Buffalo—Geo. W. Finegan, 33 Welmont Place. Phone: Garfield 5991.
New York City—The Kelley-Koett Mfg. Co., 115 E. 23rd St. Phone: Stuyvesant 9-6652.
Rochester—Geo. W. Finegan, 227 Alexander St. Phone: Stone 3600.

NORTH CAROLINA
Asheville—S. & H. X-Ray Co., R. M. Arnold, Box 209.
Charlotte—S. & H. X-Ray Co., 121 Builders Bldg. Phone: 5218.

NORTH DAKOTA
Serviced from Minneapolis, Minn.

OHIO
Akron—The Kelley-Koett Mfg. Co., 1172 Big Falls Ave. Phone: Walbridge 4125.
Cleveland—The Kelley-Koett Mfg. Co., 10465 Carnegie Ave. Phone: Randolph 2386.
Columbus—The Kelley-Koett Mfg. Co., 1195 Highland St. Phone: University 4151.
Dayton—The Kelley-Koett Mfg. Co., 1304 Canfield Ave. Phone: Taylor 5771—Fulton 1153.
Toledo—The Kelley-Koett Mfg. Co., 2815 Upton Ave. Phone: Lawndale 3916.
East Central Ohio is serviced from Pittsburgh, Penn.
Southern Ohio is serviced from Covington, Ky.

OKLAHOMA
Tulsa—The Kelley-Koett Mfg. Co., 210 Court Arcade. Phone: 3-9854.
Southern Oklahoma is serviced from Dallas, Texas.

OREGON
Portland—Shaw Supply Co., 620-24 S. W. 11th Ave. Phone: Broadway 3456.

PENNSYLVANIA
Philadelphia—The Kelley-Koett Mfg. Co., 3625 Walnut St. Phone: Baring 4500.
Pittsburgh—The Kelley-Koett Mfg. Co., 2015 Jenkins Arcade. Phone: Atlantic 9053.
Scranton—The Kelley-Koett Mfg. Co., 620 Spruce St. Phone: Scranton 3-3063.
Northwestern Pennsylvania is serviced from Buffalo, N. Y.

RHODE ISLAND
Serviced from Boston, Mass.

SOUTH CAROLINA
Columbia—S. & H. X-Ray Co., S. L. Shehee, Apt. D-3, Heathwood Court Apts.

SOUTH DAKOTA
Northern South Dakota is serviced from Minneapolis, Minn.
Southern South Dakota is serviced from Omaha, Neb.

TENNESSEE
Memphis—The Kelley-Koett Mfg. Co., 1153 Union Ave. Phone 2-8686.
Nashville—The Kelley-Koett Mfg. Co., 229 Bennie Dillon Bldg.

TEXAS
Abilene—R. P. Kincheloe Co., 1402 Beech St. Phone: 3929.
Dallas—R. P. Kincheloe Co., 2929 Elm St. Phone: 7-5895.
El Paso—Southwestern Surgical Supply Co., 311 Mills St. Phone: M-3660.
Houston—R. P. Kincheloe Co., 1207 McKinney Ave. Phone: Fair. 1311.
San Antonio—R. P. Kincheloe Co., 500 Navarro St. Phone: Cath. 7221.
Waco—R. P. Kincheloe Co., 2318 No. 15-A St. Phone: 5237.

UTAH
Serviced from Denver, Colo.

VERMONT
Serviced from Boston, Mass.

VIRGINIA
Richmond—The Kelley-Koett Mfg. Co., 210 E. Franklin St. Phone: 3-2292.
Northern Virginia is serviced from the District of Columbia.

WASHINGTON
Seattle—Shaw Supply Co., 313 University St. Phone: El. 6994.
Tacoma—Shaw Supply Co., 755 Market St. Phone: Br. 1277.
Washington, D. C.
See District of Columbia.

WEST VIRGINIA
Charleston—The Kelley-Koett Mfg. Co., 204 Professional Bldg. Phone: Capitol 34-825.
Wheeling—X-Ray Supply Co. of W. Va., 39 Twenty-Second St. Phone: Wheeling 3356.

WISCONSIN
Milwaukee—The Kelley-Koett Mfg. Co., 2327 W. Fond du Lac Ave. Phone: Hopkins 1460.
Western Wisconsin is serviced from Minneapolis, Minn.

WYOMING
Serviced from Denver, Colo.

KELEKET FOREIGN OFFICES

AUSTRALIA
Sydney, N. S. W.—Philips Lamps (Australasia), Ltd., 69-73 Clarence St.

CANADA
ALBERTA
Calgary—Fisher & Burpe, Ltd., Ste. 7, Avonlea Apts., 25th Ave., West.
Edmonton—Fisher & Burpe, Ltd., Qu'Appelle Bldg., 110th St. Phone 24339.

BRITISH COLUMBIA
Vancouver—Fisher & Burpe, Ltd., 883 Howe St. Phone: Ti 6253.

MANITOBA
Winnipeg—Fisher & Burpe, Ltd., 219 Kennedy St. Phone: 24891 and 23714.

MONTREAL
Quebec—Canadian Metalix Co., 531 Sherbrooke St., East.

ONTARIO
Toronto—Burke Elec. & X-Ray, Ltd., 61-63 Yorkville Ave. Phone: Kingsdale 5138-9-0.

SASKATCHEWAN
Regina—Fisher & Burpe, Ltd., 2535 Winnipeg St. Phone: 5896.
Saskatoon—Fisher & Burpe, Ltd., 111 Saskatchewan Crescent. Phone: 97969.

COSTA RICA
San Jose—Jose Esquivel Hijos y Co., Box 408.

MEXICO
Guadalajara, Jal.—Carlos Nafarrate, Calle Simon Bolivar No. 231, Colonia Reforma.
Tacubaya, D. F.—Carlos Parera, Ave Revolucion 119--15.

NETHERLAND EAST INDIES
Java—Nederlandsche Telegraaf Maatschappij, Radio-Holland, N. V., Tandjong Priok.

PERU
Lima—Dr. Jose Simon, Casilla 1560.

SOUTH AFRICA
Capetown—S. A. Dental & Surgical Mfg. Co., 41-45 Burg St.

THAILAND
Bangkok—Suphan Phanich Co., Ltd.

WEST INDIES—PUERTO RICO
Santurce—Alejandro L. Tavarez, Box 3452, Stop 18½.

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